

۱۶

الف $\Rightarrow +1 < [x] \leq +2$ به ازای هر عدد حقیقی

$\Rightarrow \frac{x}{2} - 1 < [\frac{x}{2}] \leq \frac{x}{2} - 2 + 2 > -2 [\frac{x}{2}] > -2$

$\Rightarrow 0 \leq x - 2[\frac{x}{2}] < 2$ به توان $2 \Rightarrow 0 \leq (x - 2[\frac{x}{2}])^2 < 4$

$\Rightarrow [0, 4)$ ✓

ب $\log(y) = \sin(x) + 4$

$\min \log y = 3 \rightarrow y = 10^3$

$\rightarrow \log y = 4 \rightarrow y = 10^4$

$\max \log y = 5 \rightarrow y = 10^5$

$Rf = [10^3, 10^5]$ ✓

۱) $\frac{x^2 - 4}{x^2 - 9} \geq 0$

$\frac{-3}{+} \frac{-2}{-} \frac{+2}{+} \frac{+3}{+}$

$[0, \frac{2}{3}] \cup (1, +\infty)$

$a=0 \quad b=\frac{2}{3} \quad c=1$

$a+b+c = \frac{5}{3}$

$\min = 0 \rightarrow \frac{4}{9} \rightarrow \frac{2}{3}$

$\max = +\infty$

$\Rightarrow$ در صند $\Rightarrow$ ①

۲) $\frac{x^2 - 4}{x^2 - 9} \geq 0$

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الف ① $x \neq 0$ ② $x + \frac{1}{x} > 0$

$\rightarrow D = [0, +\infty)$ ③ $\sqrt{x + \frac{1}{x}} = +$

$\rightarrow f(x) = + + 2 +$ بررسی $s \mid -\frac{b}{2a} = -\frac{2}{2} = -1$

$\min + = \sqrt{2} \Rightarrow 2 + 2\sqrt{2}$

$\Rightarrow [2 + 2\sqrt{2}, +\infty)$ ✓

ب $y = (3 - \sin x)(1 + \sin x)$

$\min \sin x = -1 \rightarrow (4)(0) = 0$

$\sin x = 0 \rightarrow (3)(1) = 3$

$\max \sin x = 1 \rightarrow (2)(2) = 4$

$[0, 4]$ ✓

$f(x) = -\frac{1}{3}x + 10 \rightarrow Df = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

هر عضو در برد خود یک ۱۰ دارد $9 \times 10 = 90$

هر عضو در برد خود یک ۱۰ دارد $\Rightarrow -\frac{1+2+\dots+9}{3} \rightarrow \frac{(1+9) \times 9}{3} = -\frac{54}{3}$

۴) $90 - 15 = \underline{75}$ ✓

۲) $\Rightarrow -\frac{1+2+\dots+9}{3} \rightarrow \frac{(1+9) \times 9}{3} = -\frac{54}{3}$

$ax^2 + bx + c \geq 0$

$\Rightarrow a > 0$

$\Rightarrow \Delta = 0$

$\Rightarrow (x-2)^2 \Rightarrow a(x-2)^2$

$\Rightarrow ax^2 - 4ax + 4a \Rightarrow b = -4a, c = 4a$

$g(x) = \sqrt{-4x^2 + x - 1}$

$-4x^2 + x - 1 \geq 0 \Rightarrow g(x) = \sqrt{4x^2 + x}$

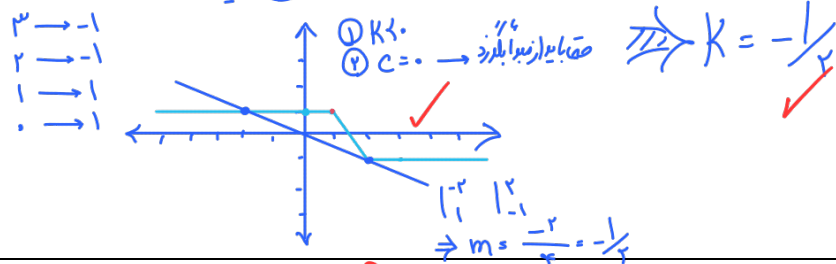
$\Delta = b^2 - 4ac = -17$

$a < 0$

$R = [2, +\infty)$

$$y = |x-2| - |x-1| = \underline{kx}$$

$$\textcircled{2} \rightarrow \text{نقطه} \leftarrow \textcircled{1}$$

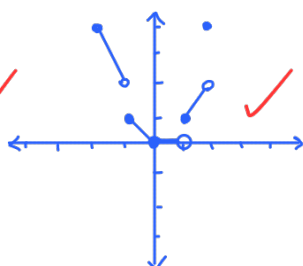


②

$$\text{الف) } y = x[x]$$

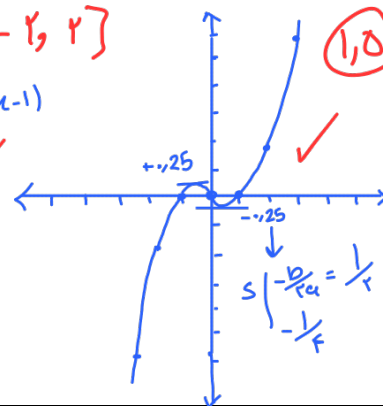
$$\begin{aligned} -2 < x < -1 & \xrightarrow{[x] = -2} y = -2x \\ -1 < x < 0 & \xrightarrow{[x] = -1} y = -x \\ 0 < x < 1 & \xrightarrow{[x] = 0} y = 0 \\ 1 < x < 2 & \xrightarrow{[x] = 1} y = x \\ x > 2 & \xrightarrow{[x] = 2} y = 2x \end{aligned}$$

$$R_f = [0, +\infty) - \{2\}$$



$$R_f = [-2, 2]$$

$$\begin{aligned} \text{if } x > 0 & \Rightarrow x^2 - x \Rightarrow x(x-1) \\ \text{if } x = 0 & \Rightarrow 0 \\ \text{if } x < 0 & \Rightarrow -x^2 - x \\ & -x(x+1) \\ & 0, -1 \end{aligned}$$



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$$y = \frac{1}{x} + \frac{1}{x+1} + \frac{1}{x(x+1)} \Rightarrow \frac{x+1+x+1}{x(x+1)} = \frac{2(x+1)}{x(x+1)}$$

$$R - \{a, b\} \Rightarrow \text{تابع برای } a, b \text{ تعریف نشده} \Rightarrow R - \{-1, 0\} \Rightarrow a+b = -1$$

$a+b = -2$
 $R_f = R - \{-1, 0\}$

①, ②

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$$f(x) = \frac{x - \sqrt{x} + 3}{x - 2\sqrt{x} + 1} \xrightarrow{\sqrt{x} = t} \frac{t^2 - t + 3}{t^2 - 2t + 1} = \frac{(t-1)(t-3)}{(t-1)^2}$$

$$\frac{t-3}{t-1} \Rightarrow f(x) = \frac{\sqrt{x}-3}{\sqrt{x}-1} \Rightarrow \frac{\sqrt{x}-1-2}{\sqrt{x}-1} = 1 - \frac{2}{\sqrt{x}-1}$$

$$\text{فرم } \frac{ax+b}{cx+d}$$

$$R_f = (-\infty, 1) \cup [3, +\infty)$$

$$\sqrt{x} = \frac{y-3}{y-1} \Rightarrow x = \frac{(y-3)^2}{(y-1)^2} \Rightarrow y = R - \{1\}$$

بر تابع:

$$(-\infty, 1) \cup (1, +\infty)$$

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$$f(x) = \frac{x^2 + 2x^2 - x - 2}{x^2 - 1} \Rightarrow \frac{x^2(x+2) - (x+2)}{(x+1)(x-1)} \Rightarrow \frac{(x+2)(x^2-1)}{(x+1)(x-1)} \Rightarrow f(x) = x+2$$

$$x^2 - 1 \neq 0 \Rightarrow x^2 \neq 1 \Rightarrow x \neq \pm 1 \rightarrow 1+2=3 \rightarrow \text{این عدد در برهه صاف و صاف قرار می‌گیرد}$$

$$\frac{3+1}{-} = \frac{4}{-}$$

②

امیرعلی عباسی

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